(1.)

	A_T	ΣA_T	R_i	D	L	P_D	P_L	P_U	ΣP_U
R	900 SF	900	1.0	100	12	90^k	11^k	126	126
4	900 SF	1800	1.0	120	40	108^k	36^k	187	313
3	900 SF	2700	1.0	120	40	108^k	36^k	187	500
2	900 SF	3600	1.0	120	40	108^k	36^k	187	687

$P_U = 687^k$ $\quad KL = 1.0 \times 14_{FT} = 14_{FT}$

W10x77 @ $KL = 14$ $\quad \phi P_n = 753^k$

DCR: $687/753 = 0.91$ ✓

(2.)

NEW $P_U = 500^k$ (SINCE NO MORE 2ND FLOOR)

$KL = 28_{FT}$ $\quad \phi P_n$ OF W10X77 $= 357^k$ N.G.

DETERMINE ϕF_{CR}. NEED KL/r

$r = \sqrt{I/A}$ $\qquad I = I_{WX} + I_{PL}$

$I_y = 154\ in^4 + I_{PL}$

↑ Y-AXIS

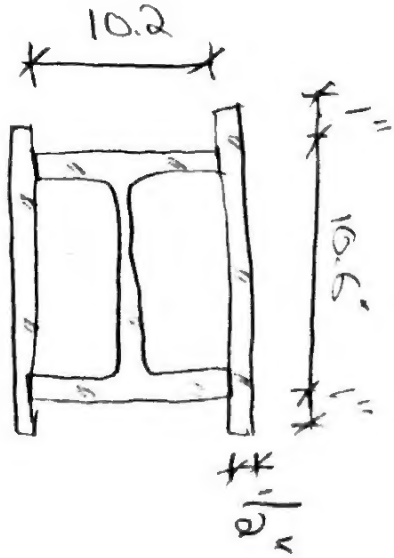
$I_{PL} = \dfrac{b(d^3 - d_1^3)}{12} = \dfrac{12.6"(11.2^3 - 10.2^3)}{12}$

$I_{PL} = 360$

$I_y = 154 + 360 = \underline{515\ in^4}$ ← GOVERNS

$I_x = 455\ in^4 + 2 \times \frac{1}{2}"(12.6)^3/12 = 622\ in^4$

↑ X-AXIS



$I_x = 622$ $I_y = 515$ $A = 22.7 in^2 + 2 \times \frac{1}{2}(12.6) = \underline{35.3 in^2}$

$r_{min} = \sqrt{515/35} = 3.8 in$

$KL/r = 1.0 \times 28 FT \times 12''/FT / 3.8 = 88$

$\phi F_{CR} = 25.5 ksi$

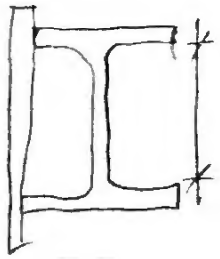
$\phi P_n = 25.5 ksi \times 35.3 in^2 = \underline{905^k}$

$DCR = 500/905 = \underline{0.55}$ ✓

CHECK b/t OF FL (W10X77 IS NON-SLENDER)

$b/t = (10.6 - 2 \times 7/8) / 1/2$

↑ SUBTRACT FLANGE t.



$b/t = 17.7$

$\lambda_r = 1.49\sqrt{E/F_y} = 36$ ✓

RETROFIT IS OKAY.